REMARKS

Responsive to the office action dated April 8, 2003, reconsideration and allowance of remaining claims 1, 2, 5, 6, 7, 10, 11 and 14 is respectfully requested.

The rejection of claims 1, 2, 5, 6, 7, 10, 11 and 14 under 35 U.S.C.102(b) as being anticipated by Schob is traversed for the reasons to follow.

The magnetic bearing apparatus described in Schob (and specifically shown in Figure 7) presents an arrangement that utilizes two rotary field machine stators 2 and 3 in order to produce the necessary circuit to enable use of an axial bearing disk and axial ring coil for producing axial forces. Two separate axially magnetized permanent magnet rings 82 and 83, or a plurality of ring segments, produce the two unipolar fluxes required for the active magnet bearing to function in such a circuit.

The invention as set forth in the instant application provides a much simpler bearing that can produce equivalent performance at a much lower cost for construction. The invention utilizes only one radial axis pole 16 (in the embodiments shown in Figures 1, 4 and 5 and now set forth as a limitation in corresponding claims 1, 2, 5, 6, 7 and 10) for producing radial forces eliminating the need for manufacture of two such radial members, significantly reducing cost. This is not possible in the embodiments shown in Schob. The permanent magnets used in the present invention are also lower in cost because magnet segments 28 mounted directly on the radial pole are used, eliminating the need for a separate, single magnet ring segment, (or segments), that typically are higher in cost (this limitation is incorporated in all the claims). No flux conduction ring is required for such construction, again minimizing cost. The magnet flux path is shorter and thus more efficient in minimizing flux leakage and flux drop due to the flux path. This minimizes the amount of magnet

material necessary to produce the required flux, and the corresponding coil power to offset it to produce the required forces. The use of one radial pole stack 16 having two coils to produce radial force, as opposed to four coils that must be energized for radial forces as shown in Schob again minimizes costs. Only one integrated rotor target is utilized for producing forces on the rotor member 14. In addition to lowering cost, this also enables the rotor to operate at higher speed by minimizing the weight and components necessary for the rotor to function, thereby providing for better rotor dynamics. The present invention also takes advantage of the integrated, one piece, thrust and rotor poles 1 for minimizing thrust bearing size. Thus, the use of the axial permanent magnet segments and a single radial pole assembly, along with the integrated thrust and rotor poles, reduces the bearing cost and provides significant advantages over the apparatus disclosed in Schob.

Independent claims 1, 6 and 11 have been amended to set forth that the device incorporates an integrated thrust and rotor pole assembly and separate permanent magnet segments, features not shown in Schob. In addition, independent claims 1 and 6 incorporate a further limitation in that a single axial radial pole assembly is set forth, a feature not shown in Schob.

It is clear under the patent law that in order to reject claims as being anticipated by a prior art reference under 35 U.S.C. § 102, every element and limitation of the claimed invention must be found in a single prior art reference (see Brown v. 3M, 60 USPQ2d 1375, 1376 (Fed. Cir. 2001). It is clear that Schob does not show every feature now set forth in independent claims 1, 6 and 11 (and thus the corresponding dependent claims) and, as a result, the rejection under 35 U.S.C. 103 is inappropriate.

AMENDMENTS TO THE CLAIMS

1. (currently amended) A magnetic bearing for supporting a rotatable member including ~~a thrust disc~~ integrated thrust and rotor poles positioned with respect to a stationary member comprising:

first magnetic field generating means for generating an axially polarized magnetic field linked magnetically through first and second air gaps between the rotatable member and the stationary member, the first axially polarized magnetic field generating means comprising first and second accurate members of high magnetic permeability and a single controllable electromagnetic coil circumferentially positioned about said first and second actuate members and radially spaced from the rotatable member, said first and second arcuate members each comprising a plurality of separate magnetic segments; and

~~second magnetic field generating means~~ a single radial pole assembly for generating a radially polarized magnetic field and being linked magnetically to the rotatable member through an air gap between the thrust disc and a radial pole assembly to provide radial magnetic flux coupling of the rotatable member to the stationary member.

2. The magnet bearing of claim 1 wherein said axially polarized magnetic field flows through first and second axial poles.

3. (cancelled) The magnetic bearing of Claim 2 wherein said first and said second arcuate members each comprise a plurality of magnetic segments.

4. (cancelled) The magnetic bearing of claim 2 wherein said first and second members comprise continuous magnetic members.

5. (currently amended) The magnetic bearing of claim ~~3~~ 1 wherein the magnetic segments comprising said first ~~and~~ arcuate members are affixed to the sides of said first axial pole and magnetic segments comprising said second arcuate members are affixed to the sides of said second axial pole.

6. (currently amended) A magnetic bearing for supporting a rotatable member including ~~a thrust disc~~ integrated thrust and rotor poles positioned with respect to a stationary member comprising:

first magnetic field generating means for generating an axially polarized magnetic field linked magnetically through first and second air gaps between the rotatable member and the stationary member, the first axially polarized magnetic field generating means comprising first and second arcurate members of high magnetic permeability, said first and second arcuate members each comprising a plurality of separate magnetic segments; and

~~second magnetic field generating means~~ a single radial pole assembly for generating a radially polarized magnetic field and being linked magnetically to the rotatable member through an air gap between the thrust disc and a radial pole assembly to provide radial magnetic flux coupling of the rotatable member to the stationary member.

7. The magnetic bearing of claim 6 wherein said axially polarized magnetic field flows through first and second axial poles.

8. (cancelled) The magnetic bearing of Claim 7 wherein said first and said second arcuate members each comprise a plurality of magnetic segments.

9. (cancelled) The magnetic bearing of claim 7 wherein said first and second members comprise continuous magnetic members.

10. (currently amended) The magnetic bearing of claim ~~8~~ 6 wherein the magnetic segments comprising said first and arcuate members are affixed to the sides of said first axial pole and magnetic segments comprising said second arcuate members are affixed to the sides of said second axial pole.

11. (currently amended) A magnetic bearing for supporting a rotatable member including ~~a thrust disc~~ integrated thrust and rotor poles positioned with respect to a stationary member comprising:

first magnetic field generating means for generating an axially polarized magnetic field linked magnetically through first and second air gaps between the rotatable member and the stationary member, the first axially polarized magnetic field generating means comprising first and second arcurate members of high magnetic permeability, said first and second arcuate members each comprising a plurality of separate magnetic segments, said axially polarized magnetic field flowing through said first and second axial poles; and

a single controllable electromagnetic coil circumferentially positioned about said first and second arcuate members and radially spaced from the rotatable member.

12. (cancelled) The magnetic bearing of Claim 11 wherein said first and said second arcuate members each comprise a plurality of magnetic segments.

13. (cancelled) The magnetic bearing of claim 11 wherein said first and second members comprise continuous magnetic members.

14. (currently amended) The magnetic bearing of claim ~~12~~ 11 wherein the magnetic segments comprising said first and arcuate members are affixed to the sides of said first axial pole and magnetic segments comprising said second arcuate members are affixed to the sides of said second pole.